REMARKS

This Amendment is filed in response to the Office Action dated 14 February 2008. Reconsideration of this application is requested in view of the foregoing amendments and the following remarks.

This application is the United States national stage of International Application No. PCT/EP2004/003415. An Article 34 Amendment was filed during International Examination of this International Application, as indicated by International Preliminary Report on Patentability ("IPER") which is part of the record in this United States application. The Notice of Acceptance mailed by the United States Patent and Trademark Office on 18 January 2007 did not indicate non-entry of the IPER annexed to the Section 371 application. Accordingly, Applicant understands the claims pending before the Examiner to be the claims as amended during International Examination. See MPEP 1893.01(a)(3).

For the convenience of the Examiner, a copy of the original claims of the International Application are included in Attachment A, a copy of the amended claims of the International Application are included in Attachment B, and a copy of the claims as amended before the International Preliminary Examining Authority showing amendments to the original claims are included in Attachment C. The claim amendments submitted herein in response to the February 14 Office Action are described with reference to the claims as amended before the International Preliminary Examining Authority, which Applicant understands to be the original claims of this United States application.

Before this amendment, claims 1-27 were pending.. Claims 1-3 and 8-11 were rejected and claims 4-7 and 12-27 were objected to. Claims 4-7, 12, 14, 17, 20, 21, and 25-27 have been amended in this amendment. Claims 28-36 have been newly added. Thus, claims 1-36 are presently pending in the application.

Specification

Claims 4-7 were objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot depend from any other multiple dependent claim.

The claims have been amended to address this objection. Reconsideration and withdrawal of the objection is respectfully requested.

35 U.S.C. 102

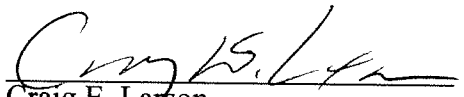
While the U.S. claims as amended are not identical to the International claims, as amended, they are similar for purposes of the Section 102(b) rejection made by the Examiner. The Examiner's rationale for the rejection of claims 1-3 and 8-11 over Hohla (WO 01/028476) suggest that the Examiner was considering the original claims of the International Application rather than the International claims as amended. All International claims as amended were found patentable by the International examiner. While the standard applied by the International examiner is not identical to that applied by the current examiner, the rationale for patentability stated in the IPER is believed by Applicant to be sufficient to rebut the current rejection. The Examiner is respectfully requested to reconsider and withdraw his rejection in view of that rationale and also in view of the current amendments.

In view of the foregoing arguments and amendments, Applicant believes that the application is in condition for allowance. An early and favorable action on the merits is solicited.

Accordingly, it is believed that all claims are now in condition for allowance. An early and favorable action on the merits is solicited. The Examiner is invited to contact the undersigned to resolve any remaining issues. This Amendment is accompanied by a one-month Petition for Extension of Time, the fee for which should be charged to Deposit Account No. 02-1425, as well as any additional fees or credits for overpayment.

Dated:

Respectfully submitted,



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Attachment A
Claims Present in International Application No. PCT/EP2004/003415 as Filed

1. System for acquiring data of an eye of a patient comprising a diagnosis unit for acquiring diagnosis data of the eye and an iris recognition unit for acquiring an iris code of the eye.

2. The system of claim 1, further comprising processing means for determining coordinates of a pupil center of the eye.

3. System of claim 1 or 2, wherein the diagnosis data and/or the iris code and/or the center of the pupil of the eye are related to a common coordinate system.

4. System of any of claims 1 to 3, further comprising storage means for storing at least two of the following data, the diagnosis data, the iris code, the coordinates of the pupil center when the pupil is not dilated and the coordinates of the pupil center when the pupil is dilated, a data designating a patient and a respective eye and data regarding the acquisition of data.

5. System of any of claims 1 to 4, wherein the diagnosis unit comprises an aberrometer which preferably acquires diagnosis data of the eye of a patient who is sitting up right, preferably a Zywave aberrometer.

6. System of any of claims 1 to 5 comprising an image pick-up unit, preferably a video camera which is preferably working in the infrared region.

7. System of any of claims 4 to 6, wherein the storage means comprises means for reading and writing data on a data carrier, preferably a chip card.

8. System for aligning and for tracking of an eye of a patient with reference to an ophthalmic unit for performing a diagnosis and/or treatment of the eye comprising means for providing a previously acquired iris code of an eye of a patient, an iris recognition unit for acquiring an iris code of the eye under investigation as a present iris code, and a comparator for comparing the present iris code with a previously acquired iris code and providing a comparison result, wherein said ophthalmic unit performs said diagnosis and/or treatment of the eye when said comparison result is greater than an identification determining level.

9. System of claim 8, wherein said comparator comprises means for performing correlation between said present iris code and said previously acquired iris code, wherein said present iris code is related to a first rotational position and said previously acquired iris code is related to a second rotational position, a modification unit for modifying the present iris code and/or the previously acquired iris code such the relative position between the first rotational position and the second rotational position is changed, and a determining unit for determining the highest correlation between said present iris code and said previously acquired iris code being modified over a predetermined range of relative rotation.

10. System of claim 9, wherein the eye under investigation is aligned to the ophthalmic unit by said rotational shift corresponding to the highest correlation between the present iris code and the previously acquired iris code.

11. System of any of claims 8 to 10, further comprising processing means for determining coordinates of a pupil center of the eye under investigation, wherein the present coordinates of the pupil center are used in aligning and tracking the eye with reference to the ophthalmic unit.

12. System of any of claims 8 to 11, wherein the ophthalmic unit comprises a refractive surgery apparatus comprising an excimer laser for correction of refractive defects of the eye.

13. System of claim 12, wherein said refractive surgery system performs the correction of refracting defects based on diagnosis data previously acquired for said eye.

14. System of any of claims 8 to 13, comprising a first image pick-up unit having a high resolution for providing an image of the eye to the iris recognition unit and preferably a second image pick-up unit being preferably faster than said first image pick-up unit for providing images being used for tracking the eye with reference to the ophthalmic unit.

15. System of claim 14, wherein said first and said second image pick-up unit being arranged at an angle to each other such that the respective images taken of the eye matches at a predetermined height position of the eye under investigation.

16. System of claim 15, further comprising control means for performing the diagnosis and/or treatment of the eye by said ophthalmic unit when a match between said images of the first and said second image pick-up units is detected.

17. Iris recognition unit especially for use in a system according to any of claims 1 to 16 comprising an image pick-up unit for acquiring an image of the eye, an image processing unit for determining iris information at a plurality of positions of the image of the eye and a generating unit for generating an iris code based on said iris information at said plurality of positions of the image of the eye.

18. Iris recognition unit of claim 17 comprising means for determining the iris/pupil border and/or the iris/limbus border, wherein said image processing unit determines the plurality of positions based on the relative position of the iris/pupil border with respect to the iris/limbus border.

19. Iris recognition unit of claim 18, wherein said relative position of said iris/pupil border with respect to said iris/limbus border is calculated based on a deviation of a center point of the iris/pupil border with respect to a center point of the iris/limbus border, and/or the length of a radial line starting from a certain point at the iris/pupil border and ending at a corresponding point at the iris/limbus border.

20. Iris recognition unit of any of claims 17 to 19, wherein said image processing unit comprises comparing means for comparing grey values of at least two individual pixels at or in the neighbourhood at each respective position of said plurality of positions.

21. Iris recognition unit of claim 20, wherein said comparing means compares the grey values of pixels present in at least one of the following regions, an inner ring surrounding a particular position, a middle ring, surrounding said inner ring, an outer ring surrounding said middle ring, the region above and below a horizontal axis and

the region on the left side and the right hand side of a vertical axis going through said particular position.

22. Iris recognition unit of claim 21, wherein said comparing means compares an average of the grey values of pixels within one of said regions with the average of grey values of pixels within a neighbouring region and provides the binary result for each comparison based on whether the difference of the respective average values is greater or smaller than a threshold value.

23. Iris recognition unit of any of claims 20 to 22, wherein said generating unit receives the comparison results as a set of binary values, preferably six binary values for each particular position and provides said iris code by arranging said sets of binary values in a predetermined order corresponding to the relative positions used in the image processing unit.

24 Iris recognition unit of claim 23, wherein the iris code comprises said sets of binary values in the form of at least one matrix.

25. Method for acquiring data of an eye of a patient using a system according to any of claims 1 to 7.

26. Method for aligning and/or tracking of an eye with reference to an ophthalmic unit using a system according to any of claims 8 to 16.

27. Method for iris recognition using a system according to any of claims 17 to 23.

Attachment B
Claims as Amended Before the International Preliminary Examining Authority

1. System for acquiring data of an eye of a patient comprising a diagnosis unit for acquiring diagnosis data of the eye and
an iris recognition unit further comprising an image pick-up unit for acquiring an image of the eye and comparing means for acquiring an iris code of the eye by comparing grey values of at least two individual pixels at or in the neighbourhood of a plurality of positions.

2. The system of claim 1, further comprising processing means for determining coordinates of a pupil center of the eye.

3. System of claim 1 or 2, wherein the diagnosis data and/or the iris code and/or the center of the pupil of the eye are related to a common coordinate system.

4. System of any of claims 1 to 3, further comprising storage means for storing at least two of the following data, the diagnosis data, the iris code, the coordinates of the pupil center when the pupil is not dilated and the coordinates of the pupil center when the pupil is dilated, a data designating a patient and a respective eye and data regarding the acquisition of data.

5. System of any of claims 1 to 4, wherein the diagnosis unit comprises an aberrometer which preferably acquires diagnosis data of the eye of a patient who is sitting up right, preferably a Zywave aberrometer.

6. System of any of claims 1 to 5 comprising an image pick-up unit, preferably a video camera which is preferably working in the infrared region.

7. System of any of claims 4 to 6, wherein the storage means comprises means for reading and writing data on a data carrier, preferably a chip card.

8. System for aligning and for tracking of an eye of a patient with reference to an ophthalmic unit for performing a diagnosis and/or treatment of the eye comprising means for providing a previously acquired iris code of an eye of a patient, an iris recognition unit further comprising an image pick-up unit for acquiring an image of the eye and comparing means for acquiring an iris code by comparing grey values of at least two individual pixels at or in the neighbourhood of a plurality of positions of the eye under investigation as a present iris code, and
a comparator for comparing the present iris code with a previously acquired iris code and providing a comparison result, wherein said ophthalmic unit performs said diagnosis and/or treatment of the eye when said comparison result is greater than an identification determining level.

9. System of claim 8, wherein said comparator comprises means for performing correlation between said present iris code and said previously acquired iris code, wherein said present iris code is related to a first rotational position and said previously acquired iris code is related to a second rotational position,
a modification unit for modifying the present iris code and/or the previously acquired iris code such the relative position between the first rotational position and the second rotational position is changed,

and a determining unit for determining the highest correlation between said present iris code and said previously acquired iris code being modified over a predetermined range of relative rotation.

10. System of claim 9, wherein the eye under investigation is aligned to the ophthalmic unit by said rotational shift corresponding to the highest correlation between the present iris code and the previously acquired iris code.

11. System of any of claims 8 to 1O, further comprising processing means for determining coordinates of a pupil center of the eye under investigation, wherein the present coordinates of the pupil center are used in aligning and tracking the eye with reference to the ophthalmic unit.

12. System of any of claims 8 to 11, wherein the ophthalmic unit comprises a refractive surgery apparatus comprising an excimer laser for correction of refractive defects of the eye.

13. System of claim 12, wherein said refractive surgery system performs the correction of refracting defects based on diagnosis data previously acquired for said eye.

14. System of any of claims 8 to 13, comprising a first image pick-up unit having a high resolution for providing an image of the eye to the iris recognition unit and preferably a second image pick-up unit being preferably faster than said first image pick-up unit for providing images being used for tracking the eye with reference to the ophthalmic unit.

15. System of claim 14, wherein said first and said second image pick-up unit being arranged at an angle to each other such that the respective images taken of the eye matches at a predetermined height position of the eye under investigation.

16. System of claim 15, further comprising control means for performing the diagnosis and/or treatment of the eye by said ophthalmic unit when a match between said images of the first and said second image pick-up units is detected.

17. Iris recognition unit especially for use in a system according to any of claims 1 to 16 comprising
an image pick-up unit for acquiring an image of the eye,
an image processing unit for determining iris information at a plurality of positions of the image of the eye and
a generating unit further comprising comparing means for generating an iris code based on said iris information at said plurality of positions of the image of the eye by comparing grey values of at least two individual pixels at or in the neighbourhood of said plurality of positions.

18. Iris recognition unit of claim 17 comprising means for determining the iris/pupil border and/or the iris/limbus border, wherein said image processing unit determines the plurality of positions based on the relative position of the iris/pupil border with respect to the iris/limbus border.

19. Iris recognition unit of claim 18, wherein said relative position of said iris/pupil border with respect to said iris/limbus border is calculated based on a deviation of a center point of the iris/pupil border with respect to a center point of the iris/limbus

border, and/or the length of a radial line starting from a certain point at the iris/pupil border and ending at a corresponding point at the iris/limbus border.

20. Iris recognition unit of any of claims 17 to 19, wherein said image processing unit comprises comparing means for comparing grey values of at least two individual pixels at or in the neighbourhood at each respective position of said plurality of positions.

21. Iris recognition unit of claim 20, wherein said comparing means compares the grey values of pixels present in at least one of the following regions, an inner ring surrounding a particular position, a middle ring, surrounding said inner ring, an outer ring surrounding said middle ring, the region above and below a horizontal axis and the region on the left side and the right hand side of a vertical axis going through said particular position.

22. Iris recognition unit of claim 21, wherein said comparing means compares an average of the grey values of pixels within one of said regions with the average of grey values of pixels within a neighbouring region and provides the binary result for each comparison based on whether the difference of the respective average values is greater or smaller than a threshold value.

23. Iris recognition unit of any of claims 20 to 22, wherein said generating unit receives the comparison results as a set of binary values, preferably six binary values for each particular position and provides said iris code by arranging said sets of binary values in a predetermined order corresponding to the relative positions used in the image processing unit.

24 Iris recognition unit of claim 23, wherein the iris code comprises said sets of binary values in the form of at least one matrix.

25. Method for acquiring data of an eye of a patient using a system according to any of claims 1 to 7.

26. Method for aligning and/or tracking of an eye with reference to an ophthalmic unit using a system according to any of claims 8 to 16.

27. Method for iris recognition using a system according to any of claims 17 to 23.

Attachment C
Claims as Amended Before the International Preliminary Examining Authority Showing Amendments to Original Claims

1. System for acquiring data of an eye of a patient comprising a diagnosis unit for acquiring diagnosis data of the eye and an iris recognition unit further comprising an image pick-up unit for acquiring an image of the eye and comparing means for acquiring an iris code of the eye by comparing grey values of at least two individual pixels at or in the neighbourhood of a plurality of positions.

2. The system of claim 1, further comprising processing means for determining coordinates of a pupil center of the eye.

3. System of claim 1 or 2, wherein the diagnosis data and/or the iris code and/or the center of the pupil of the eye are related to a common coordinate system.

4. System of any of claims 1 to 3, further comprising storage means for storing at least two of the following data, the diagnosis data, the iris code, the coordinates of the pupil center when the pupil is not dilated and the coordinates of the pupil center when the pupil is dilated, a data designating a patient and a respective eye and data regarding the acquisition of data.

5. System of any of claims 1 to 4, wherein the diagnosis unit comprises an aberrometer which preferably acquires diagnosis data of the eye of a patient who is sitting up right, preferably a Zywave aberrometer.

6. System of any of claims 1 to 5 comprising an image pick-up unit, preferably a video camera which is preferably working in the infrared region.

7. System of any of claims 4 to 6, wherein the storage means comprises means for reading and writing data on a data carrier, preferably a chip card.

8. System for aligning and for tracking of an eye of a patient with reference to an ophthalmic unit for performing a diagnosis and/or treatment of the eye comprising means for providing a previously acquired iris code of an eye of a patient, an iris recognition unit further comprising an image pick-up unit for acquiring an image of the eye and comparing means for acquiring an iris code by comparing grey values of at least two individual pixels at or in the neighbourhood of a plurality of positions of the eye under investigation as a present iris code, and
a comparator for comparing the present iris code with a previously acquired iris code and providing a comparison result, wherein said ophthalmic unit performs said diagnosis and/or treatment of the eye when said comparison result is greater than an identification determining level.

9. System of claim 8, wherein said comparator comprises means for performing correlation between said present iris code and said previously acquired iris code, wherein said present iris code is related to a first rotational position and said previously acquired iris code is related to a second rotational position, a modification unit for modifying the present iris code and/or the previously acquired iris code such the relative position between the first rotational position and the second rotational position is changed, and a determining unit for determining the highest correlation between said present iris code and said previously acquired iris code being modified over a predetermined range of relative rotation.

10. System of claim 9, wherein the eye under investigation is aligned to the ophthalmic unit by said rotational shift corresponding to the highest correlation between the present iris code and the previously acquired iris code.

11. System of any of claims 8 to 10, further comprising processing means for determining coordinates of a pupil center of the eye under investigation, wherein the present coordinates of the pupil center are used in aligning and tracking the eye with reference to the ophthalmic unit.

12. System of any of claims 8 to 11, wherein the ophthalmic unit comprises a refractive surgery apparatus comprising an excimer laser for correction of refractive defects of the eye.

13. System of claim 12, wherein said refractive surgery system performs the correction of refracting defects based on diagnosis data previously acquired for said eye.

14. System of any of claims 8 to 13, comprising a first image pick-up unit having a high resolution for providing an image of the eye to the iris recognition unit and preferably a second image pick-up unit being preferably faster than said first image pick-up unit for providing images being used for tracking the eye with reference to the ophthalmic unit.

15. System of claim 14, wherein said first and said second image pick-up unit being arranged at an angle to each other such that the respective images taken of the eye matches at a predetermined height position of the eye under investigation.

16. System of claim 15, further comprising control means for performing the diagnosis and/or treatment of the eye by said ophthalmic unit when a match between said images of the first and said second image pick-up units is detected.

17. Iris recognition unit especially for use in a system according to any of claims 1 to 16 comprising
an image pick-up unit for acquiring an image of the eye,
an image processing unit for determining iris information at a plurality of positions of the image of the eye and
a generating unit further comprising comparing means for generating an iris code based on said iris information at said plurality of positions of the image of the eye by comparing grey values of at least two individual pixels at or in the neighbourhood of said plurality of positions.

18. Iris recognition unit of claim 17 comprising means for determining the iris/pupil border and/or the iris/limbus border, wherein said image processing unit determines the plurality of positions based on the relative position of the iris/pupil border with respect to the iris/limbus border.

19. Iris recognition unit of claim 18, wherein said relative position of said iris/pupil border with respect to said iris/limbus border is calculated based on a deviation of a center point of the iris/pupil border with respect to a center point of the iris/limbus border, and/or the length of a radial line starting from a certain point at the iris/pupil border and ending at a corresponding point at the iris/limbus border.

20. Iris recognition unit of any of claims 17 to 19, wherein said image processing unit comprises comparing means for comparing grey values of at least two individual pixels at or in the neighbourhood at each respective position of said plurality of positions.

21. Iris recognition unit of claim 20, wherein said comparing means compares the grey values of pixels present in at least one of the following regions, an inner ring surrounding a particular position, a middle ring, surrounding said inner ring, an outer ring surrounding said middle ring, the region above and below a horizontal axis and the region on the left side and the right hand side of a vertical axis going through said particular position.

22. Iris recognition unit of claim 21, wherein said comparing means compares an average of the grey values of pixels within one of said regions with the average of grey values of pixels within a neighbouring region and provides the binary result for each comparison based on whether the difference of the respective average values is greater or smaller than a threshold value.

23. Iris recognition unit of any of claims 20 to 22, wherein said generating unit receives the comparison results as a set of binary values, preferably six binary values for each particular position and provides said iris code by arranging said sets of binary values in a predetermined order corresponding to the relative positions used in the image processing unit.

24 Iris recognition unit of claim 23, wherein the iris code comprises said sets of binary values in the form of at least one matrix.

25. Method for acquiring data of an eye of a patient using a system according to any of claims 1 to 7.

26. Method for aligning and/or tracking of an eye with reference to an ophthalmic! unit using a system according to any of claims 8 to 16.

27. Method for iris recognition using a system according to any of claims 17 to 23.